CLAIMS

What is claimed is:

1. An antibody that binds to loop 6 of human CCR5 and inhibits infection of immunodeficiency virus of human cells.

2. The antibody of claim 1, wherein the immunodeficiency virus is human immunodeficiency virus type I, human immunodeficiency virus type 2 and simian immunodeficiency virus.

3. The antibody of claim 1, wherein the antibody is a monoclonal antibody.

4. The antibody of claim 3, wherein the monoclonal antibody is a single chain antibody.

5. The antibody of claim 1, wherein CDR2 of the heavy chain variable region of the antibody comprises amino acid sequence $GSTX_1YNPSL$ [SEQ ID NO: 32], wherein X_1 is asparagine (N) or threonine (T).

6. The antibody of claim 1, wherein CDR2 of the light chain variable region of the antibody comprises amino acid sequence $DAX_2\ X_3L$ [SEQ ID NO: 33], wherein X_2 is threonine (T) or serine (S), and X_3 is threonine (T) or aspartic acid (D).

7. The antibody of claim 1, wherein the CDR2 of the heavy chain variable region of the antibody comprises amino acid sequence $GSTX_1YNPSL$ [SEQ ID NO: 32]; and CDR2 of the light chain variable region of the antibody comprises amino acid sequence $DAX_2\ X_3L$ [SEQ ID NO: 33], wherein X_1 is asparagine (N) or threonine (T), X_2 is threonine (T) or serine (S), and X_3 is threonine (T) or aspartic acid (D).

8. The antibody of claim 1, wherein the CDR3 of the heavy chain variable region of the antibody comprises 5, 6, 7, 8, 9 or more consecutive amino acid residues of an amino acid sequence selected from the group consisting of SEQ ID NOs: 43-45.

9. The antibody of claim 1, wherein the CDR3 of the light chain variable region of the antibody comprises 5, 6, 7, 8, 9 or more consecutive amino acid residues of an amino acid sequence selected from the group consisting of SEQ ID NOs: 46-48.

10. The antibody of claim 1, wherein the CDR3 of the heavy chain variable region of the antibody comprises an amino acid sequence selected from the group consisting of SEQ ID Nos: 43-45; and CDR3 of the light chain variable region of the antibody comprises an amino acid sequence selected from the group consisting of SEQ ID Nos: 46-48.

11. The antibody of claim 1, wherein the heavy chain variable region of the antibody comprises an amino acid sequence selected from SEQ ID Nos: 36, 38, and 40.

12. The antibody of claim 1, wherein the light chain variable region of the antibody comprises an amino acid sequence selected from SEQ ID Nos: 37, 39, and 41.

13. The antibody of claim 1, wherein the antibody is selected from the group consisting of SEQ ID NOs: 19, 21, 23, 27, 29, and 31.

14. The antibody of claim 1, wherein the antibody is encoded by a polynucleotide selected from the group consisting of SEQ ID NOs: 18, 20, 22, 26, 28, and 30.

15. The antibody of claim 1, wherein the loop 6 of human CCR5 comprises SEQ ID NO: 2.

16. A recombinant expression vector encoding a polypeptide selected from the group consisting of SEQ ID NOs: 36-41.

17. The recombinant expression vector of claim 16 is a bacterial, yeast, plant, mammalian or viral expression vector.

18. A recombinant cell expressing a polypeptide selected from the group consisting of SEQ ID NOs: 36-41.

19. The recombinant cell of claim 18 is a bacterial, yeast, plant or mammalian cell.

20. The recombinant cell of claim 18 is a human cell.

21. An antibody than binds to the N-terminus of human CCR5 and comprises a heavy chain variable region identified by SEQ ID NO: 34.

22. The antibody of claim 21, wherein the antibody is a monoclonal antibody.

23. The monoclonal antibody of claim 21 wherein the light chain variable region is identified by SEQ ID NO: 35.

24. The monoclonal antibody of claim 21 is encoded by a polynucleotide identified by SEQ ID NO: 16 or 24.

25. The monoclonal antibody of claim 21 is a single chain antibody.

26. The monoclonal antibody of claim 25, wherein the single chain antibody is SEQ ID NO: 17 or 25.

27. A method for preventing or treating HIV infection, comprising:
administering the antibody of claims 1 or 21 to a host.

28. The method of claim 23, wherein the host is a human.

29. The method of claim 28, further comprising:
administering to the host an anti-retroviral agent.

30. The method of claim 29, wherein the anti-retroviral agent is selected from the group consisting of nucleoside and non-nucleoside HIV reverse transcriptase inhibitors, HIV protease inhibitors, and HIV integrase inhibitors.

31. The method of claim 30, wherein the nucleoside HIV reverse transcriptase inhibitor is selected from the group consisting of zidovudine, didanosine, zalcitabine, lamivudine, stavudine, abacavir, and adefovir dipivoxil.

32. The method of claim 30, wherein the non-nucleoside HIV reverse transcriptase inhibitor is selected from the group consisting of nevirapine, delavirdine and efavirenz.

33. The method of claim 30, wherein the HIV protease inhibitor is selected from the group consisting of indinavir, ritonavir, saqinavir, nelfinavir, and amprenavir.

34. A method for screening a tester agent for anti-HIV activity, comprising:

contacting the antibody of claims 1 or 21 with a tester agent wherein the binding of the tester agent to the antibody indicates that the tester agent is capable of binding to HIV envelope protein and inhibits the binding of the HIV envelope protein to human CCR5.

35. A kit for HIV diagnostics or treatment, comprising:

a container containing the antibody of claims 1 or 21.